



Red Rocks Lake Wildlife Refuge – Identifying Groundwater Discharge using Unmanned Aerial Systems

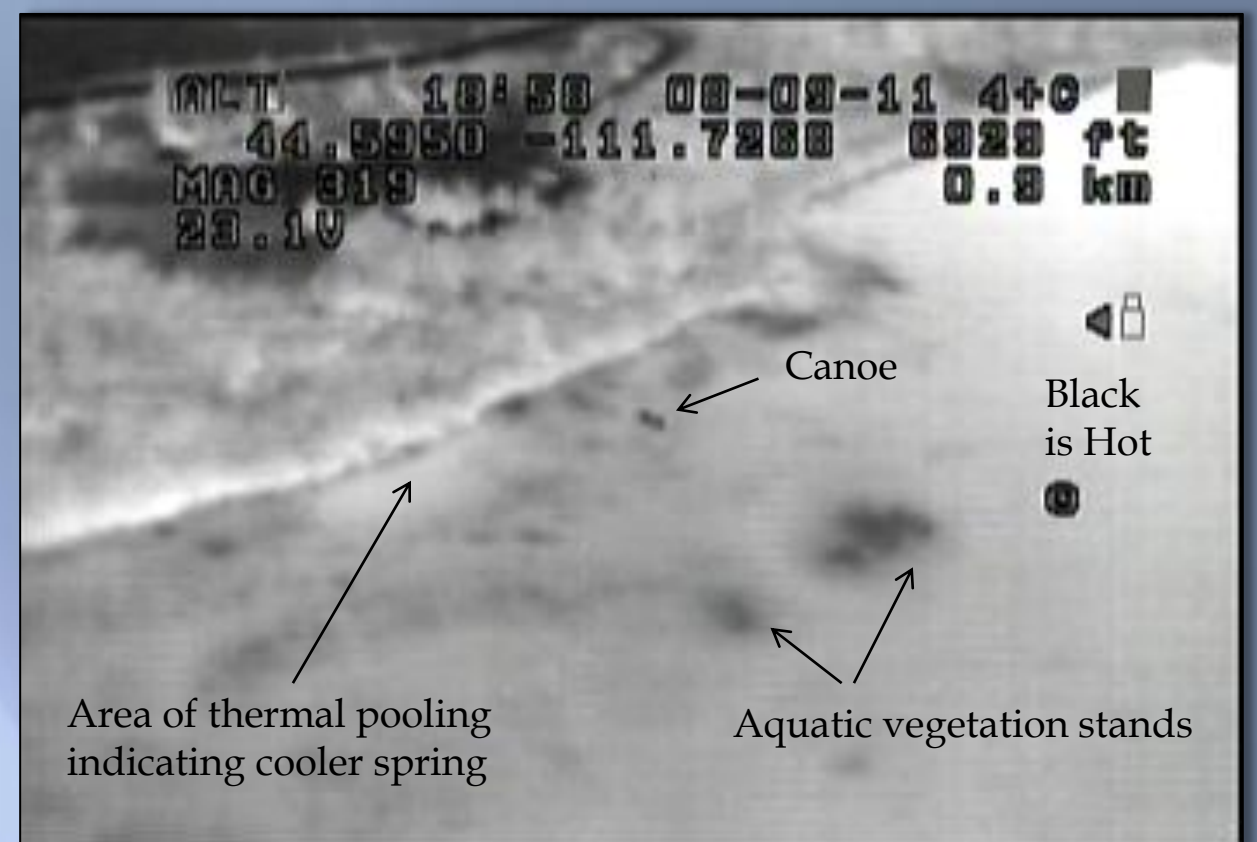
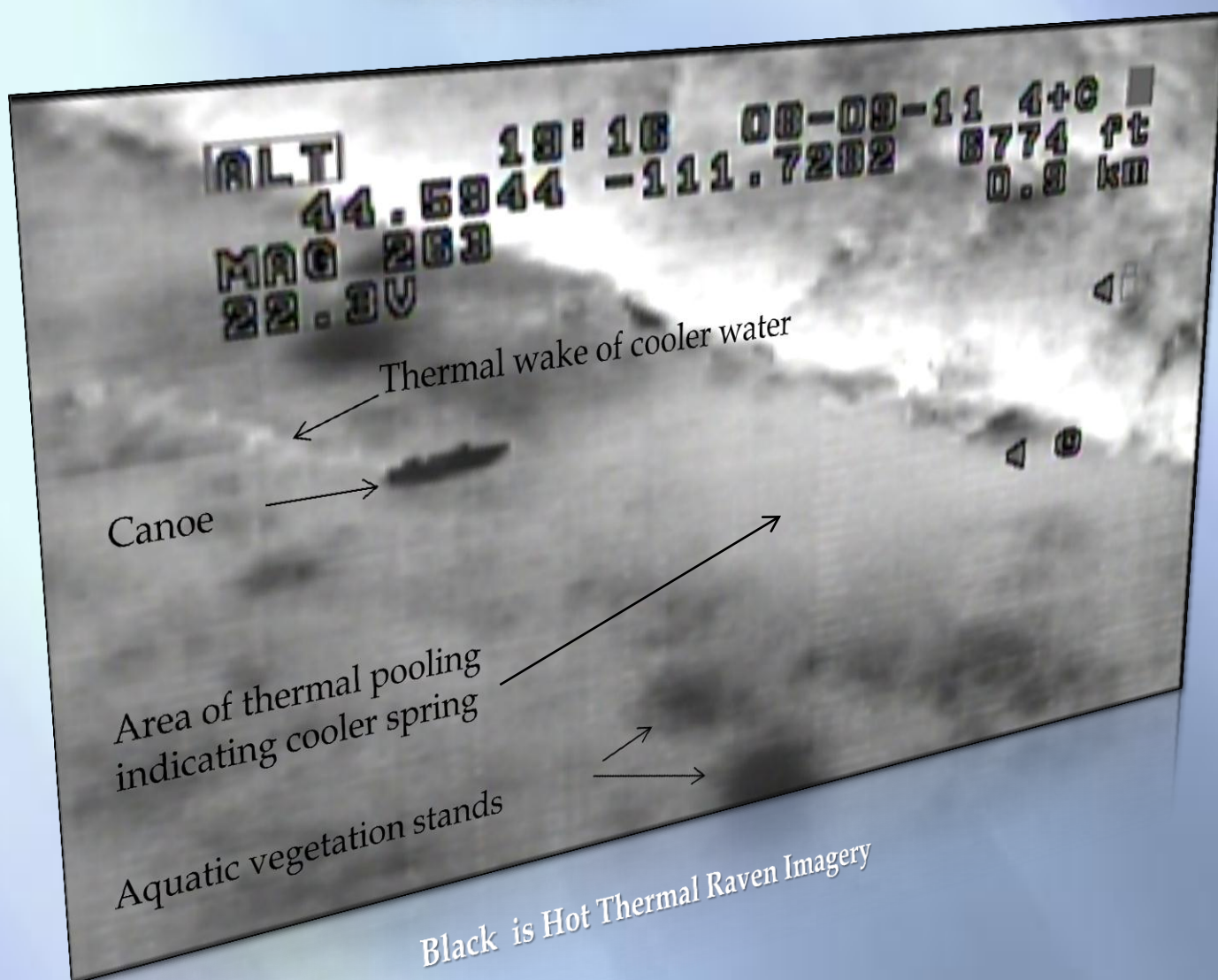
August 8-12, 2011



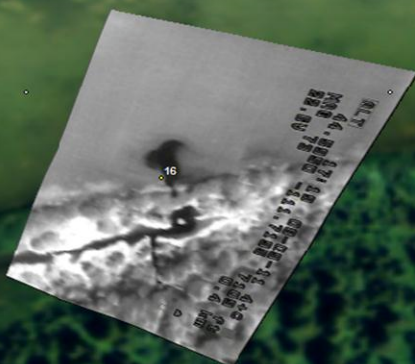
Understanding groundwater discharge helps FWS managers maintain habitat for declining populations of trumpeter swans and other inhabitants of the refuge.



The Department of the Interior – U.S. Geological Survey
Raven RQ-11A Unmanned Aerial System



Groundwater discharge is an important part of the water cycle. These fresh water springs near Red Rocks Lake are indicated by dense cooler water which tends to pool in various areas.



Raven thermal IR image georeferenced to natural color imagery



Raven UAS operations at Upper Red Rocks Lake, National Wildlife Refuge, MT